

On Floral Morphology of *Androcorys japonensis* F. Maekawa and Systematic Position of this Species

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Floral morphology of *Androcorys japonensis* F. Maekawa, a rare orchid in Japan, is described based on fresh materials, and its systematic position is discussed.

Schlechter (1919) proposed a monotypic genus *Androcorys* based on the Chinese plant (*A. ophioglossoides* Schltr.). The distinguishable characters of *Androcorys* in the descriptions were 1) large helmet-shaped anther locules, 2) convex bi-lobed stigmata with stipes, and 3) spurless entire lip. In the descriptions of the genus, he also proposed that *Androcorys* belonged to its own monotypic subtribe *Androcorythiae* of his *Basitonae* (now treated as a synonym of *Orchidoideae*). This treatment was recently followed by Brieger et al. (1992).

Maekawa (1936) described a second species of the genus *Androcorys* based on the specimen collected from Mts. Yatsugatake, Japan, *A. japonensis* F. Maekawa. Descriptions of Schlechter (1919) and Maekawa (1936) were based on the dried specimens. It is difficult to investigate the small flowers in detail and there remained some ambiguities in the observation of column structure. Maekawa obtained additional living materials of *A. japonensis* for his *Wild Orchids of Japan* and made several additional comments and corrections of his previously drawn figure (Maekawa 1971); however, the flowers drawn in Maekawa (1971) were in the young fruiting plant and

details of young flower, especially of column, were not yet reported. *Androcorys japonensis* is a rare orchid and it is difficult to obtain materials. I recently obtained several fresh materials with mature bud and young flowers and I could examine the details of floral morphology of this species. My observations were somewhat different from those of Schlechter and Maekawa, and some new findings were obtained. Thus, I would like to describe the floral structure of *A. japonensis* and to discuss the systematic position of the genus *Androcorys*.

Materials and Methods

In July of 1993, I collected two inflorescences of *Androcorys japonensis* in matured bud and young flowering stages at Mts. Yatsugatake and preserved them in 70% ethanol. In July of 1995, Mr. Kenju Imai provided me two additional inflorescences at young and somewhat aged stages from the same locality. These flowers were investigated under the binocular microscope.

Results

Figure 1 shows the dissected flower of *A.*

japonensis. Brief description on a flower of *A. japonensis* is as follows:

Flowers was yellowish green and c. 1.5 mm across (Fig. 1A). Middle sepal was concave, ovate and c. 0.6 mm long (Fig. 1F); lateral sepals were patent and curving anteriorly at apex, oblong-lanceolate and c. 1.5 mm long (Fig. 1H). Petals were connivent with the middle sepal, broadly ovate, slightly larger than the middle sepal and c. 0.8 mm long (Fig. 1G). Lip was pendent, narrowly deltoid, entire and c. 1.5 mm long, with two very shallow hollows at base (Fig. 1I). Spur was absent. Column was c. 1.0 mm across (Fig. 1B, C). Anther locules were helmet-like and covered the

rostellum and stigmas; they were connecting above and divergent below (Fig. 1B-al); staminodes were conspicuous (Fig. 1B-sm). Rostellum was strap-shaped, overlapped and concealed by the anther locules and stigma lobes (Fig. 1B-r). Stigmas and styles under stigmas were cylindrical and somewhat protruding (Fig. 1C-s₁, s₂, s₃, st); two lateral stigma lobes were developed and convex (Fig. 1B-s₂, s₃); middle stigma lobe was small and was covered by rostellum (Fig. 1C, E-s₁). Stigma lobes in young flowers and buds were already covered with particles of pollinia and only some particles of pollinia were remained in anther locules. No complete pollinia were observed.

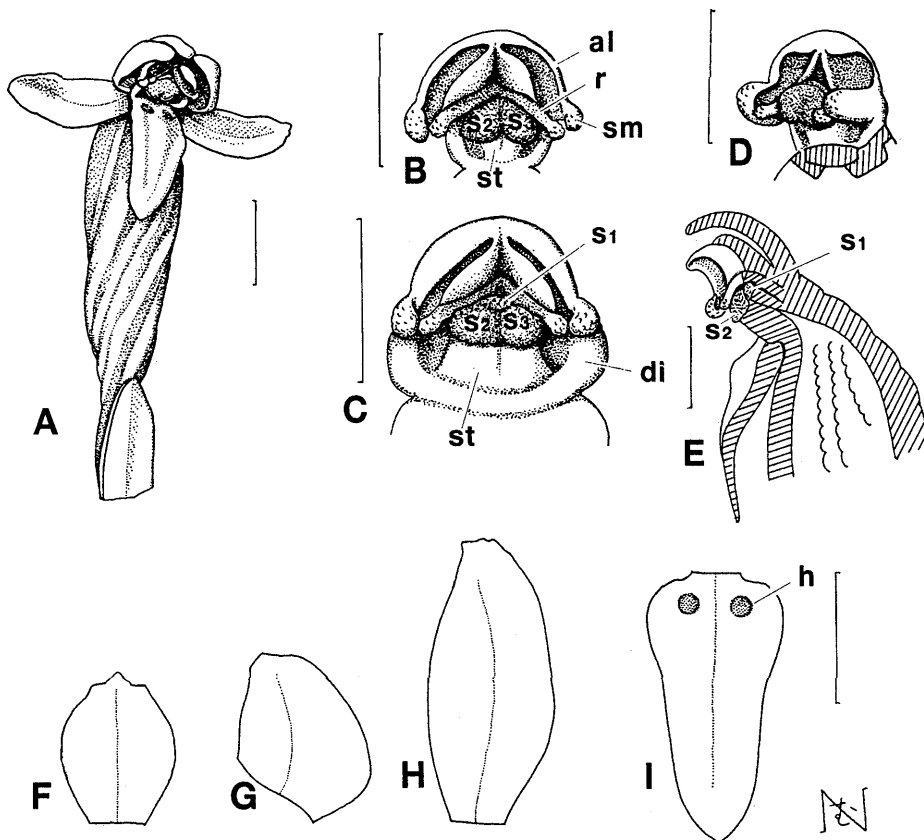


Fig. 1. Flower of *Androcorys japonensis*. A, front view of a flower; B, column, front view of young flower; C, column front view of aged flower; D, column, lateral view; E, longitudinal section of a flower, showing middle stigma lobe; F, middle sepal; G, petal; H, lateral sepal; I, lip. al, anther locule; di, disk; h, hollow; r, rostellum; s₁, middle stigma lobe; s₂ & s₃, lateral stigma lobe; sm, staminode; st, style. Scale, 1 mm. Drawn by Mrs. Mutsuko Nakajima.

Viscidium was not differentiated from rostellum. A disk under the stigmas was not conspicuous in a young flower and became conspicuous in an aged flower (Fig. 1C-di).

Discussion

Schlechter (1919) stated that *Androcorys* has two convex (lateral) stigmas. Indeed, only two convex lateral stigma lobes were observed in a young flower in *A. japonensis* (Fig. 1B-s₂, s₃). However, the middle stigma lobe was evidently observed in longitudinal section which was covered by rostellum (Fig. 1E-s₁) and could be observed in an aged flower (Fig. 1C-s₁). That is, stigmatic surface of *A. japonensis* consists of three stigma lobes, and forms a convex plane. Styles under lateral stigmas (Fig. 1C-st) were protruding. This feature of stigmas is common with those of some species of *Platanthera*, especially *P. brevicealcarata* (Inoue 1979). Most of *Habenaria* and *Herminium* species show two prominent separated lateral stigmas and somewhat different from *Androcorys japonensis*.

Schlechter (1919) stated that two stigmas have stipes; however, stipes were not observed in my studies, although lateral stigmas and styles under them were protruding. Schlechter may have misidentified the styles under the lateral stigmas as the stipes.

Maekawa (1971) pointed out the presence of prominent disk under anther locules and stigmas. I found that the disk was not conspicuous in a bud or young flower and that it became conspicuous in an aged flower. The lateral walls of column and base of column under stigmas and styles seemed to develop after pollination and to become the disk.

Viscidium was not differentiated from rostellum in the investigated samples of *A. japonensis*. This feature may be a unique feature observed only in *A. japonensis* or an abnormal feature in the investigated samples. It needs future study to investigate whether

this feature is common with other *Androcorys* species and other samples of *A. japonensis*.

As viscidia were not formed, it is difficult to be pollinated by insects. Loose packing of pollinia suggested that they seemed to drop separately, and self-pollination seemed to occur. Convex and protruding stigmas make it easy to pollinate automatically. Undifferentiation of viscidia may be the results of habitual self-pollination.

Lip of *A. japonensis* has no spur, and two very shallow hollows (Fig. 1I-h) exist at the base of lip. It is possible that these hollows are nectaries. It needs future study to confirm this.

In conclusion, *Androcorys* seems allied to a certain species of *Platanthera* based on stigma morphology. However, there are several differences between *Androcorys* and *Platanthera*. *Androcorys* has an oblong tuber, no spur and a prominent disk developing after flowering; while *Platanthera* has a fusiform or root-like elongate tuber, a mostly tubular spur, and no prominent disk. From the differences and correspondences of characters, *Androcorys* can be recognized as an independent genus related to *Platanthera*; however, *Androcorinae* can not be recognized as an independent subtribe and can be merged into *Platantherinae*.

I thank Mr. Kenju Imai for kindly providing the information of locality and the samples; I also thank Mrs. Mutsuko Nakajima for drawing the figure.

References

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井上 健: ミスズランの花部形態とその分類学的 重要性

ミスズランは稀な植物で花部形態の詳しい報告がなかった。ミスズランの新鮮な材料を入手し、花部形態について調べることができたので報告した。中国の植物に基づきミスズラン属を発表した **Schlechter** は属の特徴のひとつとして、柄のある2個の柱頭を挙げた。また、**Schlechter** は主にこの特徴に基づきミスズラン亜連を提案した。ミスズランの若い花では正面から見ると2個の側方の柱頭しか見えないが、花を縦断すると中央上部に小さい柱頭が存在することが認められた。また **Schlechter** の指摘した柄の存在は確認できなかった。ミスズランの柱頭およびその下部にある突起した花柱の形態は基本的にツレサギソウ属のニイタカチドリと一致することを明らかにした。前川

博士はミスズランの蕊柱の基部に円形の座布団状の構造の存在を指摘した。この構造は若い花ではあまり顕著でなく、やや古くなり多分受精した花で認められた。この組織は蕊柱の側壁と蕊柱の基部の組織が発達して形成されると思われる。これらの形質からミスズラン属は独立の属として認めることは出来るものの、独立の亜連とは認められずツレサギソウ亜連の一員とするのが適当と結論した。また、花粉塊の粘着体が嘴体から分離せず、形成されないことが観察された。また、若い蕾や若い花の柱頭には花粉が密に付着していた。花粉塊がバラバラと柱頭にふりかかり、自家送粉が行われている可能性が示唆された。